

## 3.15 Transportation

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### Review of EIS Section and Previous Analysis

The following summarizes the major differences between the analyses performed for this addendum and for the 1992 Final EIS. Note that this section refers to the project improvements, rather than Stage Three of the Preferred Alternative, for its comparisons to the No-Action Scenario.

- **Design year:** The 1992 Final EIS assumed a design year of 2010; this analysis assumes an opening year of 2010 and a future design year of 2030.
- **HOV lane:** The 1992 Final EIS analyzed an HOV lane on SR 520 between West Lake Sammamish Parkway and SR 202. In contrast, the project proposes to construct continuous HOV lanes past the SR 202 interchange in the eastbound direction.
- **HOV designation change from 2+ to 3+:** All scenarios analyzed in the 1992 Final EIS were based on the 2+ (two or more people) HOV designation. For this analysis, traffic forecasts for 2030 assumed that the HOV lanes would have a 3+ HOV designation. The 3+ designation is consistent with the SR 520 HOV and Bridge Replacement Project.
- **Lane placement:** WSDOT's long-range HOV system plan recommends that HOV lanes be placed on the inside lane of the corridor; SR 520's HOV lanes are currently located on the outside lane. The catalyst for transitioning the HOV lanes to the inside is assumed to be a future, and currently unfunded, project along the SR 520 corridor. Given that the SR 520/West Lake Sammamish Parkway to SR 202 Project has already been funded through construction, this analysis assumed that the year of opening (2010) would contain outside HOV lanes and the 2030 design year would contain inside HOV lanes.
- **Additional signals:** Since the 1992 Final EIS, several signals have been added to study area intersections, including SR 202 and 170th Avenue NE, SR 202 and Bear Creek Crossing, SR 202 and NE 76th Street, and NE Union Hill Road and 178th Place. Adding these signals has affected traffic patterns in the study area.
- **Development:** Since the 1992 Final EIS was published, the Redmond Town Center and Bear Creek Parkway have been constructed. In addition, the area along NE 76th Street to the west of SR 520 has also seen extensive commercial development. This development and new connections to the street grid have changed traffic patterns at the intersections of SR 520 with both SR 202 and NE Union Hill Road.
- **Mainline changes:** The 1992 Final EIS assumed that the HOV lane would terminate at I-405. Since then, the westbound HOV lane has been extended farther east and now terminates near the West Lake Sammamish Parkway interchange. Also, just west of the study area, a new interchange has been added – the 40th Street interchange, which is not part of the study area and not included in this analysis.

- **Channelization:** This refers to the basic geometrics and lane-line markings of a roadway, including the number and width of lanes and how those lanes are used (left-turn, right-turn, or through lanes). Channelization along several major roadways in the study area has changed since 1992, including SR 202 and West Lake Sammamish Parkway. Other roadways have not changed according to the *City of Redmond Comprehensive Plan* (2005c), *Transportation Improvement Program 2005-2010* (2005d), and *Capital Improvement Program 2005-2010* (2005a).

## Methodology

The transportation discipline team developed existing and future forecasted traffic volumes for 2010 and 2030. The team developed existing traffic volumes using existing count data and by performing manual counts. To develop future forecasted volumes, the team used the same travel demand model (from PSRC) that was used for the SR 520 Bridge Replacement HOV Project. The team incorporated regional and local planned/programmed projects into the travel model. AM and PM peak hour volumes were developed for both the No-Action Scenario and the project.

Three measures of effectiveness (MOEs) were used to evaluate and compare traffic operations between the No-Action Scenario and the project: LOS, travel times, and throughput. These MOEs are defined briefly in this section; however, they are detailed in Appendix F, *Transportation Discipline Report*.

### Level of Service

LOS rates the quality of traffic operations on a given transportation facility based on delay experienced by a vehicle. The LOS rating scale uses the letters A through F, where A is the best grade and F is failing; these grades represent different conditions for different facility types. This section describes LOS for the three facility types included in this project: signalized intersections, freeway mainline sections, and freeway ramp sections.

### Travel Times

AM and PM peak-hour travel times for routes in the study area are presented as a measure of an alternative's ability to efficiently provide mobility during high-use periods. Five travel routes were selected to represent the primary travel patterns in the study area. Travel times are reported for each route in both directions, for a total of ten travel time segments, please refer to Appendix F for detailed information on the travel routes.

### Vehicle (Corridor) Throughput

Measured throughput is a function of travel demand and congestion for a particular route. Given the demand for a travel route along a particular facility, throughput measures how many vehicles and people are actually getting through the area. Throughput is measured along the same routes as the travel time segments.

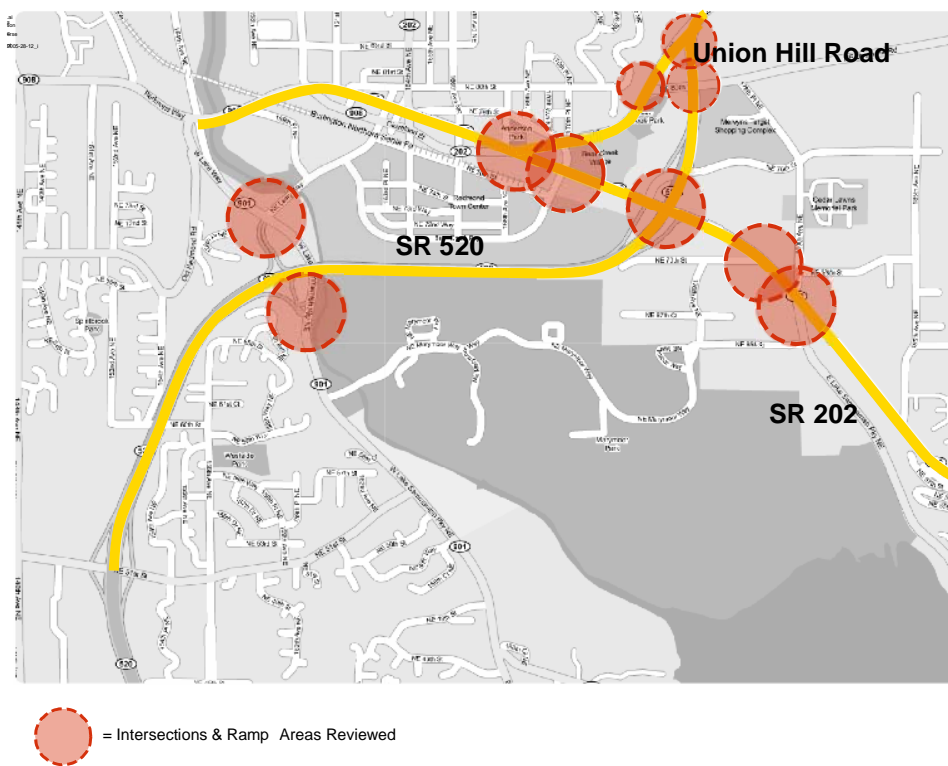
## Coordination Efforts

TAC meetings were held regularly and included representatives from WSDOT, City of Redmond, King County, Sound Transit, and the transportation discipline team. In addition, the

transportation discipline team collected transit information from both Sound Transit and King County Metro. The project team (WSDOT and transportation discipline team) worked with the City of Redmond to determine future projects in the study area, and the City of Redmond provided relevant plans and other documentation, including current plans for 2030 baseline geometric conditions at the intersections of SR 202 with 170th Avenue NE and Avondale Road Extension with NE Union Hill Road.

## Existing Conditions

This section describes the study area in its current condition, including general-purpose and HOV vehicle operations, safety, transit, nonmotorized facilities, and freight transportation by truck and rail. Figure 3.15-1 shows the signalized intersections that were evaluated for this addendum.



- SR202 and Redmond Way intersections:
  - 180th Avenue NE and East Lake Sammamish Parkway
  - NE 70th Street
  - 170th Avenue NE
  - Bear Creek Crossing
- Avondale Road intersections:
  - Avondale Road Extension and Avondale Way NE
  - Avondale Road Extension and NE Union Hill Road
  - NE Union Hill Road and Avondale Way NE

## Operational Analysis

### SR 520 Mainline, Ramps, and Weaves

Eastbound, the area before the West Lake Sammamish Parkway interchange experiences failing conditions in both the AM and PM peak hours. In addition, three areas experience failing operations in the PM peak hour: West Lake Sammamish Parkway interchange mainline, West Lake Sammamish Parkway merge, and the West Lake Sammamish Parkway to SR 202 mainline. Westbound, a LOS D is observed at the east end of the SR 520 corridor in the AM peak hour. Westbound, the SR 520 mainline operates at LOS B or better throughout the study area.

### Signalized Intersections

Overall, under existing conditions, several intersections operate at LOS F in the AM and PM peak hours (please refer to Appendix F for an illustration of intersection channelization as well as intersection volumes and LOS). The following intersections are failing:

- SR 202 and 180th Avenue NE (AM and PM peak hours)
- West Lake Sammamish Parkway and westbound SR 520 on- and off-ramp (AM peak hour)
- Avondale Road NE and Avondale Road Extension
- Avondale Road Extension and NE Union Hill Road (AM and PM peak hours)
- SR 202 and 170th Avenue North (PM peak hour)

## Accident and Safety Analysis

This section reviews collisions that have occurred in major roadways and intersections in the vicinity of the SR 520 and the SR 202 interchange. Collision information was received from WSDOT for years 2001, 2002, and 2003 at four major mainline and interchange/intersection locations:

- **SR 520** between the 51st Street interchange and SR 202 (Redmond Way)
- **SR 202** (Redmond Way and SR 908) between Sahalee Way NE and West Lake Sammamish Parkway NE
- **Avondale Road Extension** between SR 202 and Avondale Road NE
- **Avondale Way NE** between Avondale Road NE and SR 202

A total of 898 collision record summaries were received and reviewed (between 2001 and 2003) along SR 520, SR 202, and Avondale Road combined, and most of these collisions occurred along SR 202. None of these accidents were fatal, but 352 (39.2 percent) resulted in injuries. The total number of collisions and injury collisions decreased over this time period, with 25 fewer collisions and 23 fewer injury collisions in 2003 than 2001.

The predominant collision type cited for SR 520, SR 202, and Avondale Road together was rear-end (53 percent), which are most commonly associated with congested traffic operations. The next most frequent accident types were striking at an angle (10 percent), striking a fixed object (7 percent), and opposing direction collisions (6 percent).

## Transit and HOVs

### Transit Service

Transit service in the study area is provided by King County Metro, Community Transit (Snohomish County) and Sound Transit. Nine routes operate during peak hours only, another ten provide service during midday hours, and nine other routes provide weekend service. Appendix F, *Transportation Discipline Report*, describes in detail the routes passing through the study area and the destinations with which they connect Redmond.

There are two park-and-ride lots (Redmond and Bear Creek) in the study area. The Redmond Park-and-Ride has 344 parking stalls, and the Bear Creek lot has 334. The Redmond lot was at 97 percent capacity on an average weekday in the fourth quarter of 2004, while the Bear Creek lot was at 61 percent capacity. Thirteen transit routes serve the Redmond lot, and eleven serve Bear Creek.

Six transit routes operate on SR 520 in the study area: 230, 232, 233, 268, 269, and 545. Route 268 provides peak-hour service, and Route 545 provides all-day express service between Redmond and downtown Seattle via SR 520. Route 269 operates only during peak periods between Issaquah and Redmond via the Sammamish Plateau. Route 233 connects downtown Bellevue with Redmond, while route 232 continues to Duvall; both operate between 6 AM and 8 PM.

The *King County Metro Six-Year Plan* (2001-2007) sets objectives and strategies for transit, paratransit, rideshare services, and supporting capital facilities in King County. Several initiatives proposed as part of the *King County Six-Year Plan* affect the study area:

- Consolidate service on SR 520 to mitigate transfer inconvenience, provide sufficient capacity on the main segment of routes, and shift to a headway-based system (or more evenly spaced trips throughout the day).
- Improve service frequencies between downtown Seattle and Redmond.
- Explore the potential for bus rapid transit (BRT) between downtown Redmond, Overlake, and Bellevue via NE 8th Street, 156th Avenue NE, and SR 520.

*Sound Move*, Sound Transit's current ten-year plan, does not contain improvements that would significantly affect study area transit. However, Sound Transit's 2006-2016 ten-year plan is being developed and might contain the following projects that could affect study area transit:

- Construct a fixed guideway line (light rail or rail-convertible BRT) with access stations and park-and-ride lots from Overlake to Redmond.

- Develop high-capacity transit service for the SR 520 corridor as a potential project.

## HOVs

HOVs in the study area comprise primarily carpools and vanpools. HOV lanes are not on SR 520 in the study area; therefore, HOV benefits are limited. West of the study area, however, HOV lanes exist along SR 520.

## Nonmotorized

Nonmotorized transportation modes comprise bicycles, pedestrians, and equestrians. The existing roadways in the vicinity of SR 520 affect nonmotorized travel patterns. Within the study area nonmotorized activity is light, given the high traffic volumes and large intersection footprints (especially along SR 202), creating an unsupportive environment for nonmotorized traffic. The area's development pattern, however, contributes to significant pedestrian and bicycle activity in the study area.

## Bicycles

Bicycling is important to the character of the Redmond community. The city's nickname is the "Bicycle Capital of the Northwest" (City of Redmond 2006). Figure 3.11-1 in Section 3.11, Recreation, shows bicycle routes in the study area. Marymoor Park, located on the east side of the SR 520 off-ramp intersection with West Lake Sammamish Parkway, has a velodrome that is a popular venue for bicycle events. This venue is used as a starting point for bicycle tours, and it is also the southern terminus of the Sammamish River Trail. Beginning in Kenmore, this trail travels through Bothell and continues parallel to the Sammamish River into Bellevue.

The Bear Creek Trail parallels Bear Creek, located between Bear Creek Parkway and SR 520, and connects to the Sammamish River Trail north of the Leary Way intersection with West Lake Sammamish Parkway. This trail is proposed to continue northward after crossing SR 202 on the west side of SR 520.

SR 202 between Redmond and Fall City, Avondale Road NE, and NE Union Hill Road are all popular bicycle routes. Along SR 202, several proposed trails would connect with the existing Interim East Lake Sammamish Trail, which runs along the south side of SR 202 between the SR 520 northbound off-ramp and 180th Avenue NE. The Burlington-Northern Railroad right-of-way, which extends to either side of the interim trail, is planned as a multiuse trail and Class I bikeway. King County is currently negotiating the purchase of this right-of-way for a trail with Burlington-Northern Railroad.

Sidewalks or mixed-use trails are available along all study area arterials. Bicycle lanes run along West Lake Sammamish Parkway, which is a City of Redmond Class II bikeway (City of Redmond 2005c). SR 202 in the study area is a City of Redmond Class III bikeway west of Bear Creek Road, while NE 76th Street is a Class I bikeway between SR 202 and SR 520 (*Ibid*). Proposed bicycle lanes would parallel the SR 520 on- and off- ramps between NE 76th Street and NE Union Hill Road; these would connect with existing bike lanes on NE Union Hill Road east of the Avondale Road Extension intersection.

## Pedestrians

Pedestrian facilities in the study area include the trails described above and sidewalks. The only study area intersection without sidewalks is the SR 520 northbound off-ramp intersection with

West Lake Sammamish Parkway. Pedestrians in this area are served by the West Lake Sammamish Trail, which runs parallel to West Lake Sammamish Parkway. Figure 3.11-1 in Section 3.11, Recreation locates existing and proposed grade-separated trails in the study area.

Equestrians

Multiple trail facilities in the study area serve equestrians. The Bridal Crest Trail begins at Bridle Trails State Park and ends near the main entrance to Marymoor Park. Another equestrian trail is the West Lake Sammamish Trail, which follows the Sammamish River on the east side of West Lake Sammamish Parkway (Figure 3.11-1). The East Lake Sammamish Trail, which is proposed for completion on the south side of SR 202 in the Burlington-Northern Railroad right-of-way, would serve equestrians as well as pedestrians and bicyclists.

Truck and Rail Freight

Trucks

Trucks on SR 520 were counted at the SR 202 and NE Union Hill Road ramps in May 2005 during both the AM and PM peak periods (Table 3.15-1).

There is a UPS delivery facility near the NE Union Hill Road and Avondale Way NE intersection. This facility contributes to truck volumes on the SR 520 corridor in the study area.

TABLE 3.15-1  
Truck Percentages at Study Area Intersections

Location	Peak Period	Truck Percentage
SR 520 on-ramp at SR 202	AM	8.2
Avondale Extension (SR 520) at NE Union Hill Road	AM	3.8
SR 520 off-ramp at SR 202	PM	3.0
Avondale Extension (SR 520) at NE Union Hill Road	PM	3.3

Railroads

A Burlington-Northern Railroad railroad track parallels SR 202 on the south side, crossing SR 520 approximately 300 feet south of the SR 520 and SR 202 intersection. At this time, Burlington-Northern Railroad no longer operates trains on the track, and is negotiating with King County to sell the right-of-way.

Future Conditions With and Without the Project

Three MOEs were used to evaluate and compare traffic operations between the No-Action Scenario and the project: LOS, travel times, and throughput. The traffic operations analysis and results is detailed in Appendix F and summarized here. This section describes LOS for the three types of facilities included in this project: signalized intersections, freeway mainline sections, and freeway ramp sections.

## Future 2010 and 2030 Operational Analysis (General-Purpose Vehicles)

### SR 520 Mainline, Ramp, and Weave Operations

#### *Eastbound SR 520*

Eastbound improvements to the No-Action Scenario between 2010 and 2030 would be caused by geometric changes at the intersection of West Lake Sammamish Parkway and Leary Way and the intersection of Avondale Road Extension and Union Hill Road. In particular, the City of Redmond has planned improvements on each leg of the Avondale Road Extension and Union Hill Road intersection (these improvements have been assumed in the No-Action Scenario and project for 2010 and 2030). These geometric changes would improve operations at those intersections.

In the AM peak hour, failing conditions would occur in the 2010 No-Action Scenario at the east end of the SR 520 corridor (SR 202 off-ramp to NE Union Hill Road); with the project, this segment would improve to LOS A. In the 2030 No-Action Scenario, failing operations would occur at the area west of the West Lake Sammamish Parkway interchange area and at the east end of the corridor; with the project in place (in 2030), this corridor would improve to LOS D or better.

In the PM peak hour, failing conditions would occur west of the West Lake Sammamish Parkway interchange in the 2010 and 2030 No-Action Scenarios. With the project improvements in place, in 2010 traffic volumes would be LOS B but would fail by 2030. Failing conditions would also occur in the 2030 No-Action Scenario at the West Lake Sammamish Parkway on-ramp through the SR 202 off-ramp. In 2030, this project would improve to LOS D or better in this area.

#### *Westbound SR 520*

Although westbound SR 520 would operate better with the project improvements in place, several locations would show a degraded LOS.

In the AM peak hour, failing operations would occur with the 2010 project in the vicinity of the SR 202 on-ramp to the West Lake Sammamish Parkway interchange area along westbound SR 520. LOS degradation between the No-Action Scenario and project improvements would occur in the vicinity of the West Lake Sammamish Parkway interchange area. By implementing the SR 202 flyover, additional volume would access the SR 520 corridor rather than using the local arterial network. Due to increased capacity, increased traffic volumes would continue downstream from the SR 202 flyover on-ramp into the weaving area, creating an LOS degradation along the mainline. By 2030, however, when the HOV lane would be placed on the inside of the SR 520 corridor, LOS in this vicinity would improve over the 2010 project improvements (in 2010, an HOV lane would not be assumed to be in this vicinity).

In the PM peak hour, the westbound traffic operations would remain relatively similar between the No-Action Scenario and the project. The SR 202 diverge would decrease from an LOS A to an LOS B with the project improvements (in both 2010 and 2030).

### Intersection Operations

This analysis uses LOS as the MOE for comparing how local intersections would operate under the No-Action Scenario and the project in 2010 and 2030. Appendix F includes the LOS, vehicle volumes, and lane configurations at study area intersections. The following section discusses intersections of particular interest.

### ***SR 202 and NE 76th Street***

With the project improvements, the SR 202 flyover ramp would negate the need for northbound SR 202 traffic to use this intersection to access westbound SR 520. As a result, the project would remove the dual left-turn lanes, which would improve operations at the intersection because fewer vehicles would traverse the intersection and signal phasing would be optimized for the other directional volumes. (See Appendix F for an illustration of project channelization.) The greatest improvement at this intersection was in the 2030 model, when LOS would improve from LOS F to LOS D in the AM peak hour.

### ***SR 202 and Eastbound SR 520 Off-Ramp***

In 2010 under the No-Action Scenario, this intersection would have failing operations in both AM and PM peak hours. With the project improvements, operations would improve to LOS B and LOS E in the AM and PM peak hours, respectively. In 2030 under the No-Action Scenario, the intersection would operate at LOS F in the AM peak hour and LOS E in the PM peak hour; this intersection would improve, however, to LOS D in both the AM and PM peak hours with the project improvements. Improved operations would primarily result from the SR 202 flyover and the corridor improvement that the flyover provides along SR 202.

### ***SR 202 and NE 70th Street***

In 2030 in the PM peak hour, this intersection would improve from LOS E to LOS D with the project improvements.

### ***SR 202 and 180th Avenue NE***

This intersection failed in the AM and PM peak hour models under the No-Action Scenario in 2010 and 2030. The project, however, would improve operations to LOS E or better.

### ***West Lake Sammamish Parkway and SR 520 Eastbound Ramps***

Under existing and 2010 baseline conditions the northbound right-turn delay would cause the intersection to fail in the PM peak hour. Traffic currently backs all the way to the SR 520 eastbound off-ramp and onto eastbound SR 520. Sometime before 2030, the City of Redmond has programmed an additional southbound left-turn lane for installation as part of its CIP program; a second receiving lane in the east approach (over the Sammamish River) is also programmed. These geometric changes would improve intersection operations as a whole and the northbound right-turn movement in particular. Failing operations, however, would be observed in the AM peak hour for both the No-Action Scenario and the project in 2030.

### ***West Lake Sammamish Parkway, NE Leary Way, and SR 520 Westbound On- and Off-Ramps***

In 2010, this intersection would fail during the PM peak hour under the No-Action Scenario. With the project improvements in place, conditions would improve to LOS D in both the AM and PM peak hours. The City of Redmond CIP project scheduled for the intersection of West Lake Sammamish Parkway and NE Leary Way (described above) would improve operations at this intersection as well. Traffic modeling showed that by 2030 the No-Action Scenario would operate at LOS D during the PM peak hour. The project would not improve LOS in the PM peak but would improve AM peak hour operations slightly.

### ***Avondale Road Extension and NE Union Hill Road***

The future channelization configuration at this intersection is currently being considered for the Union Hill Road Phase 2 Project. The City of Redmond provided the most recent channelization recommendations for the Avondale Road Extension and NE Union Hill Road intersection, and

these were incorporated into all analysis scenarios. (See Appendix F for an illustration of the proposed channelization.)

In 2010 and 2030, AM peak hour operations would remain at failing conditions for both the No-Action Scenario and the project. While the intersection would remain at LOS F with the project improvements, it would nevertheless accommodate more traffic.

In the PM peak hour, 2010 operations would degrade from LOS C to LOS D. By 2030, an LOS E is anticipated for both the No-Action Scenario and the project. The slight increases in delay in 2010 and 2030 with the project improvements would occur because more traffic would move through the intersection.

### ***Avondale Way NE and NE Union Hill Road***

This intersection operated well in modeling of both the No-Action Scenario and the project; however, the project improvements increased delays slightly in some scenarios. This would occur because more traffic would be moving through the intersection after project construction.

## **Travel Times**

AM and PM peak hour travel times are a measure of how well traffic moves during periods of high use. Five travel routes were selected to represent the primary travel patterns in the study area. Travel times are reported for each route in both directions, for a total of ten travel time segments. (Please refer to Appendix F for more detailed information on the travel routes and travel times for those routes during peak hours in 2010 and 2030).

With the construction of the project, travel times would improve or remain the same for most routes in both peak hours. In general, improvements in travel time can be attributed to three improvements:

- An eastbound and a westbound auxiliary lane constructed between the West Lake Sammamish Parkway and SR 202 interchanges along SR 520
- An additional HOV lane in each direction of SR 520
- A flyover ramp from northbound SR 202 to westbound SR 520

The auxiliary lane would reduce the merging delays experienced on eastbound SR 520 in both 2010 and 2030. If the project were not built, drivers would experience heavy congestion at the east end of SR 520, resulting in substantially higher travel times. The project would construct a flyover ramp that modeling showed would substantially reduce travel times along SR 202, particularly in the southbound direction. This is because the southbound to westbound phase was removed from the signal at SR 202 at 76th Avenue NE, reducing signal delays and queuing. This travel-time reduction occurred in both 2010 and 2030.

With the project improvements, travel time would increase through the Avondale Road and NE Union Hill Road intersection to westbound SR 520 in the 2030 AM peak hour; this would result from more traffic traveling through these intersections due to improved capacity along SR 520.

## **Year 2010 Travel Time Summary**

For 2010, most travel times would remain the same or improve for both the No-Action Scenario and for the project (Table 3.15-2 below). Travel times along SR 520 would substantially improve because of the increased capacity and extension of the HOV lane. Additionally, travel times

would also improve along SR 202 because of the flyover ramp. For vehicles traveling northbound on SR 202 headed for westbound SR 520, the flyover ramp would eliminate the need to travel through one intersection. In addition, because the heavy flyover volume would be eliminated from the SR 202 and 76th Street intersection, the signal phasing would be optimized. This would give more green time to the eastbound and westbound movements, providing operational improvements along the SR 202 corridor.

TABLE 3.15-2  
2010 Corridor Travel Times<sup>1</sup>

Travel Route Description	AM Peak Hour		PM Peak Hour	
	No-Action	Build	No-Action	Build
SR 520 eastbound: general purpose lanes from before West Lake Sammamish Parkway to the Avondale Road Extension and NE Union Hill Road intersection	3	2	3	2
SR 520 eastbound: HOV lane from before West Lake Sammamish Parkway to the Avondale Road Extension and NE Union Hill Road intersection	3	2	4	2
SR 520 westbound: general purpose lanes from east of Avondale Road Extension (on Avondale Road NE) to SR 520 westbound west of West Lake Sammamish Parkway	11	5	3	3
SR 520 westbound: HOV lanes from east of Avondale Road Extension (on Avondale Road NE) to SR 520 westbound west of West Lake Sammamish Parkway	11	5	3	3
NE Union Hill Road (east of Avondale Road Extension) to SR 520 westbound west of West Lake Sammamish Parkway (general purpose)	6	10	3	3
NE Union Hill Road (east of Avondale Road Extension) to SR 520 westbound west of West Lake Sammamish Parkway (HOV)	5	10	3	3
SR 202 westbound (east of East Lake Sammamish Parkway) to SR 520 westbound west of West Lake Sammamish Parkway (general purpose)	12	5	18	4
SR 202 westbound (east of West Lake Sammamish Parkway) through past NE 170th Avenue NE (general purpose)	7	3	13	3
SR 202 eastbound (west of NE 170th Avenue NE) through past East Lake Sammamish Parkway (general purpose)	4	3	4	4

<sup>1</sup>Travel times are expressed in minutes.

### Year 2030 Travel Time Summary

Similar to 2010 results, 2030 travel times would improve throughout most of the corridor primarily because of the SR 202 flyover and the SR 520 HOV lanes (Table 3.15-3 below). Under the No-Action Scenario, travel times in 2030 between SR 202 east of East Lake Sammamish Parkway to westbound SR 520 west of West Lake Sammamish Parkway would be 26 minutes in the AM peak hour and 29 minutes in the PM peak hour. With the project improvements, travel times would be 4 minutes for both the AM and PM peak hours.

TABLE 3.15-3  
2030 Corridor Travel Times<sup>1</sup>

Travel Route Description	AM Peak Hour		PM Peak Hour	
	No-Action	Build	No-Action	Build
SR 520 eastbound: general purpose lanes from before West Lake Sammamish Parkway to the Avondale Road Extension and NE Union Hill Road intersection	3	2	3	3
SR 520 eastbound: HOV lane from before West Lake Sammamish Parkway to the Avondale Road Extension and NE Union Hill Road intersection	3	2	3	2
SR 520 westbound: general purpose lanes from east of Avondale Road Extension (on Avondale Road NE) to SR 520 westbound west of West Lake Sammamish Parkway	9	4	5	4
SR 520 westbound: HOV lanes from east of Avondale Road Extension (on Avondale Road NE) to SR 520 westbound west of West Lake Sammamish Parkway	9	3	5	4
NE Union Hill Road (east of Avondale Road Extension) to SR 520 general purpose lanes westbound west of West Lake Sammamish Parkway	7	10	5	4
NE Union Hill Road (east of Avondale Road Extension) to SR 520 HOV Lanes westbound west of West Lake Sammamish Parkway	7	12	5	4
SR 202 westbound (east of East Lake Sammamish Parkway) to SR 520 general purpose lanes westbound west of West Lake Sammamish Parkway	12	5	14	4
SR 202 westbound (east of East Lake Sammamish Parkway) through past NE 170th Avenue NE (general purpose)	9	5	11	3
SR 202 eastbound (west of NE 170th Avenue NE) through past east Lake Sammamish Parkway (general purpose)	7	5	6	5

<sup>1</sup>Travel times are expressed in minutes.

Modeling indicated that travel times along one analyzed route would degrade under the project, compared to the No-Action Scenario, for both general-purpose and HOV vehicles. The route begins at NE Union Hill Road (east of Avondale Road), goes through the NE Union Hill Road and Avondale Road intersection, and continues onto westbound SR 520 west of West Lake Sammamish Parkway. The added capacity along SR 520 would make the SR 520 corridor a more attractive route, and vehicles would use this facility rather than the local arterial system (as would occur under the No-Action Scenario). The traffic shift to SR 520 would increase the traffic volume at the Avondale Road Extension and NE Union Hill Road intersection with the project, which would cause traffic to spend a longer time there because of additional congestion; this would increase the overall travel time on the route. Currently, the NE Union Hill Road and Avondale Road intersection is not assumed to include an HOV bypass lane that would allow HOV vehicles to go past the vehicle queue waiting to enter SR 520; therefore, both HOV and general-purpose volumes would create a delay at this intersection.

## Vehicle (Corridor) Throughput

Measured throughput is a function of travel demand and congestion for a particular route. Given the demand for a travel route along a particular facility, throughput measures how many vehicles and people are actually getting through the area; throughput is measured along the same routes as the travel time segments, which represent the primary travel patterns in the study area.

Increases in throughput with the project along SR 520 when compared to the No-Action Scenario can be attributed to increased volume (demand) along the route due to capacity improvements, which would make the travel route more attractive. Increased demand and capacity together would work to increase the study area throughput. Because the project would add more lanes to SR 520, more vehicles would try to use the facility, and more of those trying would successfully traverse the study area.

The project improvements would increase throughput compared to the No-Action Scenario on most analyzed routes during both the AM and PM peak hour in 2010 and 2030. Vehicle throughput would increase by two times or more on multiple route sections (see Appendix F for more detail).

### Year 2010 Vehicle Throughput Summary

With the project improvements, throughput in the corridor would increase by 2010, with throughput on several freeway segments increasing by two times or more. In particular, throughput on SR 520 westbound between Avondale Way to west of West Lake Sammamish Parkway would increase from 630 vehicles under the No-Action Scenario to 1,530 vehicles with the project. At the same time, the travel time in this segment would decrease from 11 to 5 minutes. Both the increased travel time and the increased throughput demonstrated with the project improvements would primarily result from increased westbound capacity.

### Year 2030 Vehicle Throughput Summary

Similar to 2010, the project would increase corridor throughput in 2030, primarily resulting from the SR 202 flyover and the added capacity along SR 520.

## Future 2010 and 2030 Operational Analysis (Transit and High-Occupancy Vehicles)

Several project capacity improvements would benefit HOV and transit. An HOV lane along SR 520 in the eastbound direction would extend to the eastern terminus of the corridor, and in the westbound direction an HOV lane would begin just east of the West Lake Sammamish Parkway interchange (please refer to Figure 1-2 for an illustration of the study area). Also, the SR 202 flyover would have one lane designated as HOV (the other general-purpose lane would be metered). The added HOV lanes would provide a continuous trip from the SR 520 Evergreen Point Bridge deck to Redmond, allowing carpools and transit seamless access and increasing travel speeds and time savings during peak hours. Additionally, HOV and transit would experience travel time savings compared to general-purpose traffic. The following section discusses project benefits in 2010 and 2030.

### Year 2010 and 2030 Travel Times for High-Occupancy Vehicles and Transit

Project benefits would be the same for HOV and transit. The traffic modeling showed that the project improvements would reduce or maintain travel times in both directions during both AM

and PM peak hour periods compared with the No-Action Scenario. The greatest travel-time savings would occur westbound during the AM peak hour, when transit vehicles using the HOV lanes would save 6 minute per trip compared to the No-Action Scenario. The number of HOVs traveling through the study area would also increase eastbound by 2010.

Compared to the No-Action Scenario, 2030 travel times would decrease in both directions during both peak hour periods (except for westbound SR 520 in the PM peak hour). The greatest travel-time savings would occur westbound during the AM peak hour, when transit vehicles using the HOV lanes would save 6 minutes per trip compared to the No-Action Scenario. At the same time HOV travel time would decrease, and the number of vehicles using the HOV system on SR 520 in the study area would increase by more than two times in the PM peak hour eastbound, and more than ten times in the AM peak hour westbound.

The project would also benefit transit vehicles using SR 202 and other local arterials compared to the No-Action Scenario. For example, King County Metro route 233 travels from Redmond to Seattle through three study area intersections: Avondale Road NE and Avondale Way, Avondale Road Extension and NE Union Hill Road, and NE 76th Street and SR 202.

Traffic modeling showed that in the AM peak hour route 233 would save 24.5 seconds of control delay (waiting at traffic signals) per trip compared with the No-Action Scenario and 8.7 seconds per trip in the PM peak hour. By 2010, the savings would increase to 48.4 seconds savings per trip in the AM peak hour and 21.7 seconds per trip in the PM peak hour.

## **Nonmotorized**

The project would improve pedestrian and bicycle access and safety at the SR 520 and SR 202 interchange by providing a marked route for nonmotorized travelers to bypass the interchange area. Bicycles and pedestrians would be prohibited along the north side of SR 202 between the new mixed-use path and NE 76th Street in order to avoid conflicts with the flyover ramp. They would also be prohibited from crossing the SR 520 eastbound off-ramp near the East Lake Sammamish Trail by an existing right-of-way fence.

The new pedestrian and bicycle route, illustrated in Figure 3.11-1 in Section 3.11, Recreation, would link the East Lake Sammamish Trail with downtown Redmond and the Bear Creek Trail, diverting travelers to the east side of SR 202 via a signalized crossing at the intersection of SR 202 and NE 70th Street. The path would then travel north along SR 202 to a separate mixed-use path leading to NE 76th Street, where travelers could continue west back to SR 202.

Alternatively, pedestrians could continue to use the sidewalk on the south side of SR 202 between the signals at NE 70th Street and NE 76th Street by using a signalized crosswalk at the intersection of the SR 520 eastbound off-ramp with SR 202.

Because this new marked path would provide a way to cross the SR 520 eastbound off-ramp at SR 202 and would augment signing of this route, pedestrians and bicyclists would be less likely to attempt to cross the off-ramp at the railroad right-of-way crossing, which has caused accidents in the past.

## **Truck and Rail Freight**

Trucks would experience benefits comparable to general-purpose vehicles on both SR 520 and SR 202. Additionally, no freight railroads are expected to be operational in the study area by 2010.

## Construction Impacts

The project would be constructed in two separate stages:

- Phase 1 would construct the new flyover ramp from northbound SR 202 to westbound SR 520. Construction is expected to begin in 2007 and be completed by the end of the year.
- Phase 2 would complete the full project buildout and includes expanding SR 520 in both the eastbound and westbound directions; construction is expected to begin in 2009 and end by 2011.

Both construction phases would impact traffic operations temporarily. The project team is currently identifying construction traffic control strategies and plans for both construction stages. The discussion below identifies potential traffic impacts for each construction phase. The formal traffic control plans would provide additional detail on detour routes and construction phasing scenarios.

### Phase 1 Construction

Three construction activities identified as potentially impacting traffic are outlined in this section. Once constructed, the proposed SR 202 flyover ramp would tie into the existing SR 202 corridor. One westbound lane of SR 202 might need to close temporarily (from approximately the eastbound SR 520 off-ramp to 180th Avenue NE). Construction currently underway along SR 202 would add an additional westbound lane; therefore, a temporary closure of one lane would accommodate traffic through SR 202.

The proposed SR 202 flyover ramp would also tie into the existing westbound SR 520 corridor and the existing westbound SR 520 on-ramp. This tie-in would require temporarily closing the existing westbound SR 520 on-ramp (likely a nighttime closure). Traffic would likely be detoured through NE 76th Street and routed towards the intersection of NE Union Hill Road and Avondale Road to access westbound SR 520.

The proposed SR 202 flyover girder would be placed near the SR 202 and NE 76th Street intersection, requiring a temporary closure of the intersection. During the temporary closure, traffic would likely be routed through Avondale Way NE where drivers have accessibility to both SR 520 and the City of Redmond. The temporary closure would likely be accomplished during the nighttime, after PM peak traffic periods.

### Phase 2 Construction

During the second construction phase, the SR 202 flyover ramp would be in place and the SR 520 mainline would be under construction for widening. Under the preliminary construction staging plans, two SR 520 mainline lanes (one lane per direction) would be open during the duration of construction. Modifying the West Lake Sammamish Parkway interchange and the SR 202 interchange might require temporary (likely at night) closures. Traffic would be rerouted to either the 51st Street interchange or to the Avondale Road Extension and NE Union Hill Road intersection to enter and exit SR 520. Traffic control plans would include detailed routing plans.

The SR 202 flyover ramp would have to be realigned with the modified SR 520 and westbound SR 520 (from SR 202) on-ramp. During the tie-in to the modified SR 520, the SR 202 flyover and the westbound SR 520 on-ramp (from SR 202) would be temporarily closed. Traffic would likely

be detoured through NE 76th Street, where traffic can access SR 520 at the NE Union Hill Road and Avondale Road intersection.

## Overall Conclusions Regarding Project Improvements

The project improvements would relieve SR 520 congestion, improve travel times on both the SR 520 and SR 202 corridors, address the high accident rate at the eastbound SR 202 off-ramp (on SR 520), and show travel time savings for HOV and transit users. The project improvements would also enhance pedestrian and bicycle access and safety in the study area and improve truck travel conditions. The project improvements would substantially improve traffic operations on SR 520 and in the project vicinity upon completion and throughout the next 20 years. At three out of the 25 locations analyzed along the project in the study area, project improvements operations would be worse than the No-Action Scenario, and traffic volumes would reach or exceed the roadway system's capacity by 2030. These three locations are the West Lake Sammamish Parkway eastbound off-ramp diverge (both AM and PM peak hours) and the intersections between West Lake Sammamish Parkway and the eastbound and the westbound on- and off-ramps (PM peak only). Transportation agencies would continue to evaluate and identify additional improvements to address those locations in the future.

## Mitigation Measures

The project improvements would not create negative impacts that would warrant traffic mitigation measures, and consequently none are proposed.